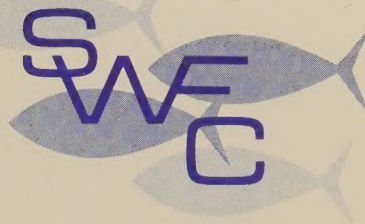




HONOLULU
LA JOLLA
MONTEREY
TIBURON



SOUTHWEST FISHERIES CENTER

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PACIFIC ENVIRONMENTAL GROUP

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STATUS OF PUBLICATIONS

Published

Smith, Paul E., Haydee Santander and Juergen Alheit. 1983. Technical detail of a cruise plan for the anchoveta spawning biomass estimate. Instituto del Mar del Peru Boletin, 7(2):25-41.

Approved by Center Director

Balazs, George H. Sea turtles and their traditional usage in Tokelau. Atoll Res. Bull.

Gooding, Reginald M. Trapping surveys for the deepwater caridean shrimps, heterocarpus laevigatus and H. ensifer, in the Northwestern Hawaiian Islands, (Abstr.) Proceedings of the Special Symposium on Resource Investigations in the Northwestern Hawaiian Islands, May 25-27, 1983, University of Hawaii, Honolulu.

Henderson, John R. Encounters and entanglements of Hawaiian monk seal with lost and discarded fishing gear. (Abstr.) Proceedings, the Fifth Biennial Conference on the Biology of Marine Mammals, Boston, Massachusetts, November 27-December 2, 1983.

Humphreys, Robert L., Jr., and Steven H. Kramer. Ciguatera and the feeding habits of the greater amberjack, Seriola dumerili, in the Hawaiian Archipelago. Proceedings of the Special Symposium on Resource Investigations in the Northwestern Hawaiian Islands, May 25-27, 1983, University of Hawaii, Honolulu.

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

Kam, Alan K.H. An usual example of basking by a green turtle in the Northwestern Hawaiian Islands. Elapaio.

Lynn, Ronald J. and Jan Svejksky. Sea surface temperature variability off California during a 'Santa Ana' as revealed by the NOAA-6 AVHRR. For consideration for publication in the Journal of Geophysical Research.

Perrin, William F. and Stephen B. Reilly. Reproductive parameters of dolphins and small whales of the family Delphinidae. For publication in the International Whaling Commission Report.

Reilly, Stephen B. Observed and maximum rates of increase in gray whales. For publication in IWC/SWFC Conference Proceedings.

Stevens, E.G., A.C. Matarese and W. Watson. Ontogeny and systematics of Ammodytoidei. For publication in the Ahlstrom Symposium Papers.

Stevens, E.G., W. Watson and A.C. Matarese. Ontogeny and systematics of Notothenioidea. For publication in the Ahlstrom Symposium Papers.

Administrative Reports

Balazs, George H. Subsistence use of sea turtles at Pacific Islands under the jurisdiction of the United States. SWFC Admin. Rep. H-83-17.

Chang, Randolph K.C., Richard W. Brill, and Howard O. Yoshida. 1983. The Kewalo Research Facility, 1958 to 1983--25 years of progress. SWFC Admin. Rep. H-83-14.

Shippen, Nathaniel T. Seamount fishery, foreign vessel observer report, Kitakami Maru (June 9-July 21, 1983). SWFC Admin. Rep. H-83-18.

Wetherall, Jerry A., and Marian Y.Y. Yong. An analysis of some factors affecting abundance of blue marlin in Hawaiian waters. SWFC Admin. Rep. H-83-16.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Specimens Collected on Seamount Cruise Identified

Research assistants Robert L. Humphreys, Jr., Scot H. Hamaguchi, and Daniel A. Mahar searched the literature for taxonomic keys and species descriptions for the identification of seamount species collected on Townsend Cromwell cruise 83-02. Literature has been assembled on original descriptions, taxonomic keys, and revisions of Antigoniidae, Carangidae, Congridae, Gempylidae, Macrouridae, Moridae, Muraenidae, Polymixiidae, Scorpaenidae, and Squalidae. Based on this material, and meristic and morphometric data for more than 100 specimens, simplified keys were devised for several fish families, including brief descriptions and notes on distinguishing characters. The following species from the seamount collection have been identified:

<u>Species</u>	<u>Family</u>
<u>Antigonia browni</u>	Antigoniidae
<u>Antigonia fowleri</u>	Antigoniidae
<u>Antigonia steindachneri</u>	Antigoniidae
<u>Carangoides ferdau</u>	
(<u>C. gymnostethoides</u>)	Carangidae
<u>Conger oligoporus</u>	Congridae
<u>Promethichthys prometheus</u>	Gempylidae
<u>Coelorhynchus aratrum</u>	Macrouridae
<u>Malacocephalus hawaiiensis</u>	Macrouridae
<u>Laemonema sp.</u>	Moridae
<u>Lepidion inosimae</u>	Moridae
<u>Physiculus sp.</u>	Moridae
<u>Gymnothorax goldsboroughi</u>	Muraenidae
<u>Polymixia nobilis (P. yuri)</u>	Polymixiidae
<u>Sebastes sp. (Hozukias sp.)</u>	Scorpaenidae
<u>Centrophorus sp.</u>	Squalidae
<u>Centroscyllium sp.</u>	Squalidae
<u>Etmopterus pusillus</u>	Squalidae
<u>Squalus mitsukurii</u>	Squalidae
<u>Squalus sp.</u>	Squalidae

Honolulu Laboratory Researchers Participate in OTEC Meetings

Richard N. Uchida, Leader, Insular Ecosystem Program, reported that he and research assistant Michael P. Seki joined Dr. Edward P. Myers, Head, Office of Ocean and Coastal Resource Management, Ocean Minerals and Energy Division, and Dr. Donald Hoss and Dr. David Peters of the Beaufort Laboratory, Southeast Fisheries Center, NMFS, in six meetings held from September 6 to 9

with researchers in Hawaii's ocean thermal energy conversion (OTEC) community to discuss NOAA's approach to assessing the potential impact of OTEC operations on fisheries. Represented at these meetings were researchers from Hawaiian Electric, E.K. Noda and Associates, Oceanic Institute, Hawaii Department of Land and Natural Resources, Hawaii Department of Planning and Economic Development, East-West Center, Natural Energy Laboratory of Hawaii, Hawaii Natural Energy Laboratory, University of Hawaii (UH) College of Engineering, UH Marine Program, and Western Pacific Program Office of the Southwest Region, NMFS.

Uchida also traveled to Puerto Rico and the U.S. Virgin Islands where similar meetings were held on September 20-22 with representatives of the OTEC community. Represented at three meetings held on these islands were researchers from Corporacion Desarrollo Recursos Marine (CODREMAR), Puerto Rico Department of Natural Resources, University of Puerto Rico (UPR) Department of Marine Sciences and Sea Grant College Program, UPR Center for Energy and Environmental Research (CEER), U.S. Virgin Islands Department of Energy, West Indies Marine Laboratory, and Martin Marietta.

Fish Taxonomist Visits Honolulu Laboratory

Dr. Graham Hardy of the National Museum of New Zealand visited Robert Humphreys and Michael Seki, and examined the Honolulu Laboratory's collection of pelagic armorhead, Pentaceros richardsoni. Hardy recently published a revision of the Pentacerotidae, which returns the pelagic armorhead to the genus Pseudopentaceros. Hardy recognizes two species of armorhead in the North Pacific and a third in the South Pacific. However, he was not aware of the morphological variation (lean and fat types) of armorhead on the southern Emperor Seamount and the northern Hawaiian Ridge.

* * * * *

The Northwestern Hawaiian Islands (NWHI) symposium paper "Ciguatera and the feeding habits of the greater amberjack, Seriola dumerili" by Robert L. Humphreys, Jr., and Steven H. Kramer was reviewed by Dr. Albert Banner of the Hawaii Institute of Marine Biology (HIMB). The paper was revised in accordance with the comments offered by Dr. Banner. The NWHI symposium paper "Seamount fishery resources within the southern Emperor-northern Hawaiian Ridge" by Robert L. Humphreys Jr., Darryl T. Tagami, and Michael P. Seki was also revised to incorporate additional information obtained from recent Japanese and Russian publications.

* * * * *

James H. Uchiyama, Fishery Biologist, and Research Assistant Darryl Tagami continued work on the NWHI atlas. Tagami prepared computer summaries of depth ranges of species by banks for fishes and invertebrates caught by trawling, trapping, handlining, and trolling.

Reports Prepared for the Plan Development Team

Researchers in the Fishery Management Research Program worked on various reports and data summaries on pelagic management unit species (blue marlin, black marlin, striped marlin, swordfish, shortbill spearfish, sailfish, sharks, and mahimahi) to aid the Pelagic Species Plan Development Team of the Council. The following reports were completed: "Cross tabulations of large pelagic oceanic species catch based on Hawaii commercial catch reports, 1978 - April 1981. I. Area fished and fishing gear by species," and "Cross tabulations of large pelagic oceanic species catch based on Hawaii commercial catch reports, 1978 - April 1981. II. Species by area fished and fishing gear," by Dr. Robert A. Skillman, Daniel C. Locey, and James C. Cooper; "Catch per unit effort for management unit species: Hawaii billfish," by Gary L. Kamer; "Annotated bibliography of selected published and unpublished works on billfish, mahimahi, wahoo, and sharks," and "Fishery information contained in versions of the preliminary and draft fishery management plans for billfishes and other pelagic species," by Victor A. Honda; "Operational and catch analysis of the charter boat Mele Moku," by Thomas S. Hida and Nathaniel T. Shippen; "A report of fish catch data extracted from the Hawaii Fishing News," by Thomas S. Hida, Victor A. Honda, and Bert S. Kikkawa; and "Estimating the species composition of Hawaii's wholesale seafood trade," by Samuel G. Pooley.

PELAGIC RESOURCES INVESTIGATION

Gill and Vascular Anatomy of Skipjack Tuna Studied

Dr. Richard W. Brill, Leader, Experimental Ecology of Tunas Program, reports that he recently completed a series of experiments designed to elucidate the fine structure of the gill and general vascular anatomy of skipjack tuna. The work is being done in association with Dr. Ken Olson of the University of Notre Dame. The technique consists of completely filling the fish's circulatory system with a special low viscosity plastic. When the plastic hardens, the fish is literally digested away with sodium hydroxide, leaving a detailed replica of the fish's circulatory system. Preliminary examination of the vascular casts revealed several new structures that have previously not been described. These structures are what appear to be small countercurrent heat exchangers serving the white muscle, and complex structures branching off the efferent end of the first gill arch which are probably oxygen or blood pressure receptors.

Mahimahi Tested for Magnetic Compass Sense

Research assistant Martina K.K. Queeneth continued to test the ability of mahimahi, Coryphaena hippurus, to detect changes in the Earth's magnetic field. All mahimahi tested so far seem to have this ability although the data are not as definitive as those obtained from yellowfin tuna, Thunnus albacares. Mahimahi do not seem able to make as many passes through a hoop (which is used as the quantitative measure of the fish's response to the

different magnetic field conditions) during the trial periods. This results because mahimahi apparently cannot sustain as high a swimming speed as can yellowfin tuna.

Work Continues on Developing Larval Rearing Techniques

Thomas K. Kazama, Fishery Biologist, continued to test various algae, rotifer, and copepod species and rearing conditions on the survival and growth of mahimahi larvae. The techniques developed for mahimahi will be applied to the culture of larval skipjack tuna, which is a much more difficult species to culture. The three adult mahimahi (one male and two females) currently being maintained at the Kewalo Research Facility (KRF), are continuing to spawn large viable batches of eggs every other day. Mahimahi eggs are being shared with HIMB and the Center for Marine Biotechnology of Florida. The mahimahi have been able to maintain this prodigious rate of spawning for approximately the past 2 months. Research assistant Linda A. Barraclough reports that the adult mahimahi are being fed a diet of squid and "fish fudge," a mixture of Ulva (seaweed), commercial trout chow, carrots, krill, squid, smelt, liquid vitamins, dolomite, yeast, and gelatin. This diet is apparently excellent for adult mahimahi as evidenced by the high rate of successful spawnings.

Yellowfin Tuna Tracked for Five Hours

The project to monitor the short-term movements and residence times of tuna around fish aggregating devices (FAD) began in earnest this month. Using the RV Kahele'ale, Dr. Kim Holland, HIMB, Lt. J. Scott Ferguson, and research assistant Lance S. Asagi were able to track a yellowfin tuna for 5-hours. The fish had been caught near a FAD off Oahu, Hawaii. This fish swam directly offshore for 5-hours and covered a distance of approximately 15 miles. The fish was lost when the directional hydrophone failed. Structural modifications are being made to the hydrophones to enable them to withstand the high speeds required when tracking tuna.

Dissertation on Magnetic Compass Sense of Yellowfin Tuna Successfully Defended

Michael M. Walker, a graduate student in the UH Department of Zoology, successfully defended his Ph.D. dissertation this month. Walker's dissertation was on the magnetic compass sense of yellowfin tuna. Much of the research was performed at the Kewalo Research Facility.

MARINE MAMMALS AND ENDANGERED SPECIES PROGRAM

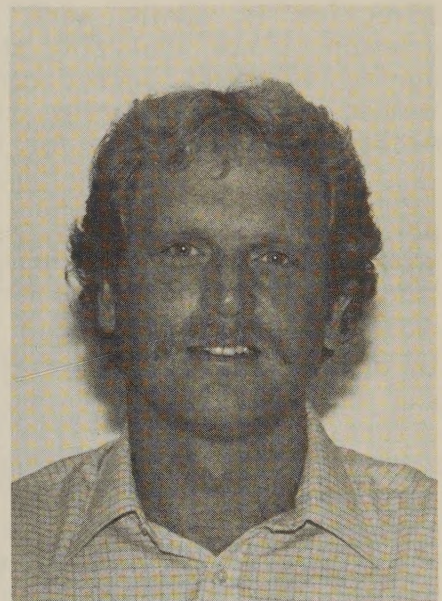
Cooperative Study of Sea Turtles Underway

William G. Gilmartin, Leader, Marine Mammals and Endangered Species Program, reports that a cooperative research project has been initiated with the University of Hawaii's (UH) Sea Grant Program to learn more about the immature green sea turtle, Chelonia mydas, around the Island of Hawaii. The year-long study will be directed at capturing and tagging turtles to gather detailed data on growth rates, recruitment, survival, movements, and food sources. Live-capture methods will include the use of scuba at the animal's nocturnal sleeping sites, and carefully monitored tangle nets set in key foraging areas. Blood samples will also be taken for sex determination analysis by sea turtle researchers at Texas A & M University.

The cooperative project will offer excellent opportunities for involvement and training of Marine Option Program students at the UH at Hilo campus under Dr. Walter Dudley, Professor of Oceanography and Geology, and George H. Balazs, Fishery Biologist. A similar sea turtle study has been started at Johnston Atoll with funds from the U.S. Army Corps of Engineers.

Dr. George W. Boehlert Joins Honolulu Laboratory Staff

Dr. George W. Boehlert joined the Honolulu Laboratory staff on September 2, 1983, as Chief, Insular Resources Investigation. Boehlert earned his Bachelor's degree at the University of California, Santa Barbara, and a Ph.D. from the Scripps Institution of Oceanography, University of California, San Diego, in 1977. His dissertation was entitled, "Physiological and morphological adaptations in the surface to benthic migration of Sebastes diploproa (Pisces: Scorpaenidae)." Immediately before joining the Honolulu staff, Dr. Boehlert was Associate Professor in the School of Oceanography and Department of Fisheries and Wildlife, Oregon State University, Newport, Oregon. Other positions held by Boehlert were Associate Marine Scientist at the Virginia Institute of Marine Science and Assistant Professor at the School of Marine Science, College of William and Mary, Gloucester Point, Virginia.



LA JOLLA LABORATORY

Coastal Fisheries Resources Division

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Collaborative Research on Dungeness Crab Underway

Richard Methot, Fishery Biologist in the Coastal Division, has been working with Drs. Louis Botsford and David Johnson of UC Davis on recruitment variation in dungeness crab. This is a challenging research problem because, in general, the environmental factors that affect mortality of crab larvae also are likely to influence mortality and recruitment of various groundfish larvae found along the coasts of northern California-Washington. In particular, recruitment of dungeness crab seems to exhibit regular and extreme variation so the possibility of detecting real differences is greatly enhanced. During September a new summary of geostrophic winds was obtained from the Southwest Fisheries Center's Pacific Environmental Group and compared to the time series of crab catch with a lag of 4 years. Winds, surface temperatures, and sea level heights that correspond to increased southward advection in spring were positively correlated with the subsequent catch. Johnson is now analyzing the distribution of crab larvae taken inadvertently during the NMFS Soviet cooperative ichthyoplankton surveys conducted for a number of years during the hake spawning season to investigate possible mechanisms responsible for the observed correlations.

Paleoclimatic Research Provides Clues to Long-Term Oceanic Variability

Relationships between anchovy and sardine stocks have often been assumed to be governed by competitive interactions due to their similar trophic level and their apparent tendency to vary inversely in abundance. However an alternative (or more likely supplementary) hypothetical mechanism governing sardine-anchovy fluctuations is differential responses to prolonged changes in environmental conditions. This latter mechanism is supported by circumstantial evidence such as 1) lack of recovery of the depleted species when fishing is reduced (e.g., California sardine, Peruvian anchoveta), 2) sudden, but prolonged outbursts (e.g., Japanese sardine), 3) the replacing species occupies a different geographic area than the replaced species (e.g., California, Peru), and 4) the depleted species shifts to a previously little-used geographic area (e.g., Peruvian anchoveta). These phenomena cannot be explained by the competition hypothesis. Unfortunately, available environmental observations such as sea surface temperatures and sea levels (which provide information on strengths of currents) do not extend far enough into the past to allow study of their long-term patterns.

Lacking direct observations, it is necessary to rely on indirect evidence. Fishery biologist Alec MacCall is surveying scientists working in various fields regarding current knowledge and research on recent paleoclimatic indicators for both hemispheres of the eastern Pacific Ocean. The study of tree rings (dendrochronology) provides an indirect record of precipitation and temperature from seasonal, temperate regions, often extending back several hundred years. Sea surface temperature reconstructions have been done for southern California (Douglas 1980, published in CalCOFI Reports), and South American investigations are currently planned or are underway at the Tree Ring Laboratories both at University of Arizona and at the Lamont-Doherty Geological Observatory. Due to the sensitivity of tree growth to the climatic conditions associated with El Niño, dendrochronology may provide precise records of past anomalies.

Another source of paleoclimatic information is anaerobic layered sediments both in marine basins or shelves, and in freshwater lakes. Extensive work on southern California oceanic sediments has been done by Andrew Soutar of Scripps Institution of Oceanography, and some work has been done by Oregon State University researchers for South America. An ongoing program investigating lake sediments of the Galapagos Islands and mainland of South America by researchers at the Ohio State University may provide an even longer record of paleoclimatic patterns.

Improved communication among researchers in these areas should result in better and more powerful interpretation of their results, as well as their application to solving problems in fishery science and management, and improved understanding of the patterns of global climatic anomalies such as have occurred during the last few years, culminating in the El Niño of 1983.

Modified Midwater Trawl Designed by Center Biologists to Capture Early Stages of Juvenile Fish

Studies of anchovy life history and variation in recruitment have historically been based on eggs and larvae collected with plankton nets, and on late juvenile and adult fish collected with a 15 m midwater trawl. Studies of late larvae and early juveniles in the size range of 20-60 mm are essential to test a variety of hypotheses concerning variation in recruitment and the importance of nearshore "nursery" areas for this purpose. To sample anchovy quantitatively in this critical size range, for example, requires a net with the proper combination of mouth area, mesh size, and tow speed.

During the cruise of the NOAA Ship David Starr Jordan, September 19-28, a new experimental sampling net, designed by William Flerx, Richard Methot and Paul Smith in the Southwest Fisheries Center Coastal Division which met these specifications, successfully captured juvenile anchovy in the 50-120 mm size range at a nearshore station north of Dana Point. The net is a modified Isaacs-Kidd midwater trawl, 12 feet in width and with a net mouth area of 10 square meters.

With the capability to sample juvenile anchovy in this size range, it will be possible to determine the abundance and distribution of juveniles

several months earlier than with the 15 m midwater trawl used to sample adult anchovy. Thus, according to the net designers, they will be able to study the process of recruitment rather than simply measuring the resultant abundance of the year class. The net should also be effective in sampling the young juvenile stages of many other fish species, including hake, Pacific and jack mackerel.

Pacific Fishery Management Council Recommends Anchovy Management Measures for Commerce Secretary

The Pacific Fishery Management Council met in San Diego on September 28-29 to recommend anchovy management measures. The Anchovy Plan Development Team is co-chaired by Drs. Alec MacCall and Rick Methot of the Southwest Fisheries Center, and includes Dr. Dan Huppert of the Center and Rick Klingbeil of the California Department of Fish and Game in Long Beach.

Team representatives attended public hearings at Monterey, Long Beach, and San Diego, California, as well as the final Council meeting. Based on analyses presented in the Plan and on public testimony, the Council selected from various options in a suite of management categories including harvest quotas, allocations, fishing seasons, area closures, and size restrictions. The recommended options were incorporated into the Plan, which is to be sent to the Secretary of Commerce for approval and implementation under the Magnuson Fishery Conservation and Management Act.

COASTAL EASTERN PACIFIC POPULATION BIOLOGY OF FISHES

Visual Threshold Determined for Schooling in Northern Anchovy

Dr. John Hunter and Ragan Nicholl, Biological Technician, completed an analysis this month of data on the laboratory determination of the visual threshold for schooling in adult anchovy. The visual threshold for schooling was determined for two groups of 50 adult northern anchovy in the laboratory under a spectral irradiance typical of the adult habitat ($0.5 \text{ mg chl a m}^{-3}$). The index of dispersion (s^2/x) and the mean distance to the nearest neighbor were used to measure changes in schooling as a function of light intensity.

The schooling threshold based on the index of dispersion fell between 4.8×10^{-12} and $7.8 \times 10^{-10} \text{ W cm}^{-2}$. At the lower value and in darkness, the index of dispersion did not differ from unity indicating that the fish were randomly disturbed. Hence no schooling existed at the lower value, whereas at the higher value the fish were clearly aggregated. Mean distance to nearest neighbor followed the same pattern with values in darkness and at the lower irradiance value being indistinguishable.

In water of low chlorophyll concentration ($0.2 \text{ mg chl a m}^{-3}$) the threshold irradiance for schooling occurs at a depth of 30 m on a star light

night and at 38 m during a full moon. Light attenuates rapidly with increasing chlorophyll concentration; at $2.0 \text{ mg chl a m}^{-3}$ the threshold occurs at a depth of 8 m on a star-light night and at a 20 m under full-moon light. Thus sufficient light exists at night within the upper 10 m for schooling to occur in most of the habitat of the anchovy but the maximum possible depth of schools is set by chlorophyll concentration and moon phase. These results may apply equally well to the maximum depth of spawning because spawning may also depend upon the ability of anchovy to see each other. The vertical distribution of newly spawned anchovy eggs seems to support this conclusion with eggs occurring at greater depths in waters of low chlorophyll concentration than at higher ones.

These data will be useful in estimating the maximum depth of schooling of anchovy schools at night and of their spawn. The depth of spawning is an important factor in recruitment studies since it affects the transport of eggs and larvae by wind driven currents.

Experimental Data on Visual Threshold of First-Feeding Anchovy Larvae Analyzed

Fishery biologist Dr. John Hunter and Sandor Kaupp, Staff Research Associate, at the Scripps Institution of Oceanography, report they have completed analyzing data from a series of experiments on the spectral sensitivity and irradiance threshold of first-feeding larval northern anchovy, Engraulis mordax.

Feeding response on the small, clear rotifer, Brachionus plicatilis, as a function of light intensity, was determined for seven different downwelling color spectrums; one was a broad bandwidth blue-green spectrum modeled after 0.8 mg m^{-3} Chl-a at 20 m depth during the middle of the day, and the others were narrow band (circa 80 nm at 0.01 of peak transmission) color filters with peak wave lengths of 442, 486, 530, 570, 600, and 624 nm. The six narrow band color filters allowed determination of an action spectrum for feeding, and the broad spectrum blue-green light was used to measure an absolute threshold for feeding, independent of implicit action spectrum.

The action spectrum for feeding in the first-feeding larva has two maxima, one near 486 nm, and the other near 570 nm, with a minima between them, near 530 nm. These peaks offset the maxima in the spectrum of downwelling light (circa 500 to 550 nm, varying with Chl-a and DOM concentration) that is, the visual sensitivity (in feeding) offsets the predominant background color, from which the prey is sighted. Dr. Charles O'Connell of the Southwest Fisheries Center showed that these early anchovy larvae have a pure cone retina at this stage of development, and that there are two morphologically distinct types. The action spectrum determined here suggests that there are quite possibly only green and blue sensitive cones. Given that there are only cones in the retina, and the action spectrum has two maxima, it appears that these early larvae are maximizing the visual contrast between the prey and the background.

Given a threshold feeding criteria, or an action spectrum with which to weight the downwelling spectra, it is possible to determine the length of the feeding day as a function of depth and season. The young larval northern anchovy can feed just below the surface of the water about 45 minutes before sunrise and after sunset. Given average Southern California Bight water ($\text{Chl } a = 0.5 \text{ mg m}^{-3}$, $\text{DOM} = 0.7 \text{ mg l}^{-1}$) the larval feeding day ranged from 11 to 15 hours, from solstice to solstice at 20 meters depth (50% of the larval exist above this depth), and from 9 to 14 hours at 50 meters depth (over 80% of the larvae exist above this depth). Below 60 meters, the feeding day length becomes severely limited with increasing depth.

Once a threshold is chosen, the physics of light penetration into the ocean dominates the calculation of the limits of depth and day length of feeding. The spectrally broad nature of the action spectrum will insure adequate visual contrast over a range of spectral compositions from the range of water types occupied by first-feeding larvae. As the larvae grow, they will enlarge the retina, field of view, area centralis, and recruit rods. All these morphological changes will enhance acuity, but the cone reception of the first-feeding larvae has already maximized visual contrast, between prey and the background.

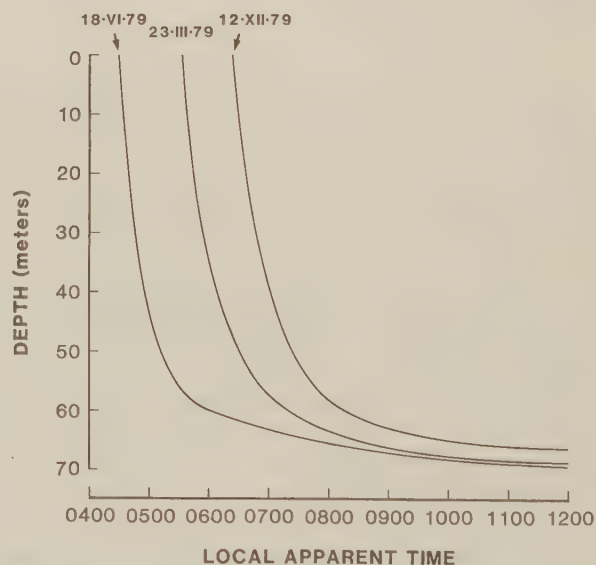
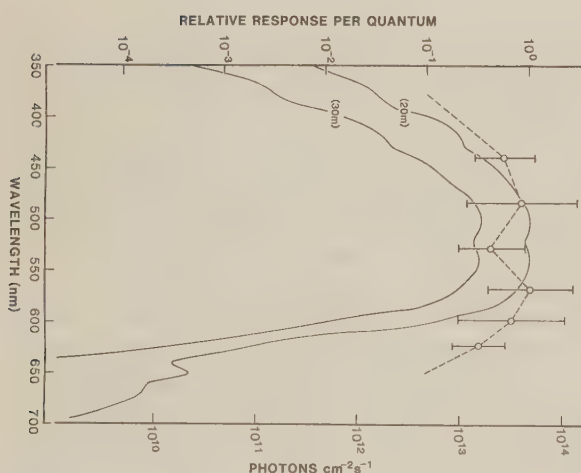


Figure 1. Action spectrum for feeding for young larval northern anchovy (5 mm SL). The points are the peak wavelengths of the color spectrums used for determination of the action spectrum, and the bars are the 95% confidence intervals for the relative effectiveness of each color to elicit feeding in the larvae.

Figure 2. Depth of 50% feeding light intensity in average larval northern anchovy water ($\text{Chl}-a = 0.5 \text{ mg m}^{-3}$, $\text{DOM} = 0.7 \text{ mg l}^{-1}$) with time of day (local apparent time) for three clear days measured at La Jolla, CA, USA (32.5 N), March 23, June 18, and December 12 of 1979.

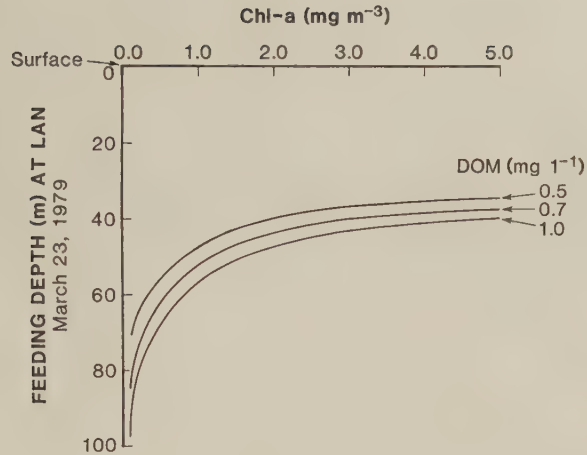
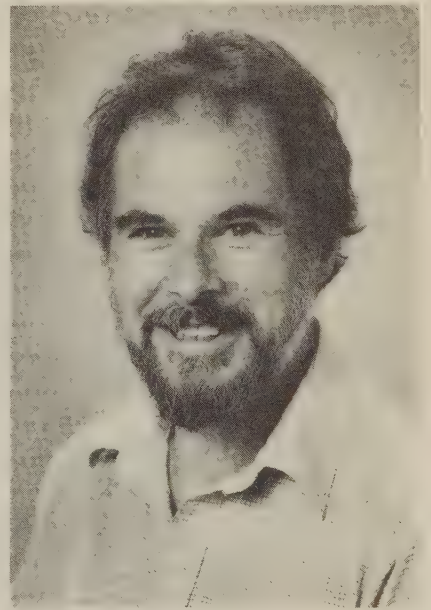


Figure 3. Depth of the 50% feeding light intensity at local apparent noon on March 23, 1979 (DOM = 0.7 mg l⁻¹) as a function of Chl-a concentration.

Canadian Scientist to Spend Research Year at SWFC

Dr. John Pringle of Fisheries and Oceans Canada will be a visiting scientist with Dr. Reuben Lasker until July 1984. He was trained in marine botany at the University of Victoria and Dalhousie University and was hired in 1974 by the Fisheries Research Branch in Halifax, Nova Scotia to develop a biological research program on eastern Canada's commercially important seaweed species. He filled in as Chief of the Invertebrates and Marine Plants Division during 1981/1982 and is presently Head of the Crustacean and Marine Plant Section. Personnel of the Section are primarily concerned with carrying out that population biology required for resource management of the American lobster.

Dr. Pringle's personal research interests involve decapod crustaceans and larval ecology. While at the Southwest Fisheries Center, Dr. Pringle will be studying the evidence for retention of lobster larvae in coastal waters with special emphasis on the California spiny lobster, *P. interruptus*. He will also be investigating the concept of subpopulations as applied to fisheries science.



Plan for Study of Recruitment Processes Proposed to IREP

Dr. Reuben Lasker, Chief of the Coastal Fisheries Resources Division and Andrew Bakun, newly-selected Chief of the SWFC's Pacific Environmental Group, participated in the IREP (International Recruitment Program) Workshop convened by UNESCO and FAO of the United Nations and held at the Bedford Institute of Oceanography in Halifax, Nova Scotia, Canada, September 26-30, 1983. The purpose of the workshop was to outline a plan for developed and developing countries to participate in a world-wide study of recruitment processes, considered to be one of the major unresolved problems of fisheries.

A minimum plan for biomass assessment was proposed to the Workshop by Dr. Lasker to take advantage of the newest technology available in fisheries research, such a birth date determination by daily ring counts of otoliths and the newly-developed egg production method being used at the Southwest Fisheries Center.

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

SWFC Scientists Travel to Japan to Attend Albacore Workshop

From September 25 through October 1, Drs. Norm Bartoo of the Oceanic Division and Michael Laurs, of the Coastal Division, traveled to the Far Seas Fisheries Research Laboratory in Shimizu, Japan, to attend the 8th North Pacific Albacore Workshop. During the workshop, 18 working papers were presented relating to the north Pacific albacore fisheries. All the attendees were Japanese except for the two SWFC scientists; no representatives from Canada or China attended.

In summary, the workshop participants concluded that catch-per-effort in all the major fisheries has shown a general declining trend since the early 1970's and has not shown an increasing trend even though total catch has declined some in the last few years. Production model analyses show MSY to be in the 90,000 to 150,000 mt range. The stock is still producing about 75,000 mt per year, although the distribution of the catch between fisheries is changing. The stock appears to be well-exploited. Remaining to be factored into the analyses are some indices of recruitment and effects of possible multiple stocks.

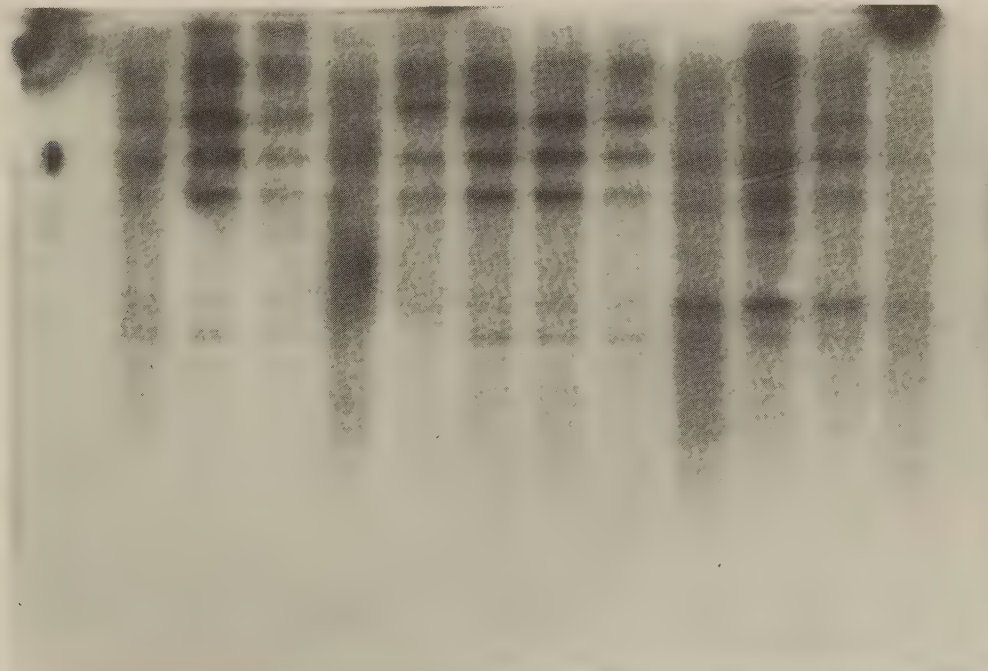
Additional DNA Samples Prepared from Eastern and Whitebelly Spinners

As reported last month, no fixed differences have been found between northern and southern offshore spotted dolphin populations, Stenella

attenuata, but there is, however, a fair degree of polymorphism within the 19 samples. For instance, digestion by the enzyme, Hinc II, of an individual sample produces one of three separate morphs, one of which researchers Andrew Dizon and John Graves found only in the northern population.

The two subspecific groups of spinner porpoise, (Stenella longirostris), eastern and the offshore whitebellies, show more distinct morphological separation than do the northern and southern offshore spotted dolphins. In order to confirm whether or not the morphological distinction observed in two spinner groups would be demonstrated by fixed differences (within each subgroup) in the mtDNA, 12 individuals from each group were sampled for tissues by biological technician James Gilpatrick. To date, DNA from 7 of the 24 samples has been prepared by biological technician Lisa Ankenbrandt, who will complete all 24 by the end of the month.

The additional 16 delphinid samples, Stenella coeruleoalba, S. longirostris, Delphinus delphis, Pseudorca crassidens, Steno bredanensis, Tursiops truncatus, Lagenorhynchus obliquidens, and Lissodelphis borealis, have shown mtDNA restriction patterns which are clearly different. This has not been the case when, in the past, protein electrophoretic methodologies were employed. Figure 1 shows the dramatic difference between 6 of the species. The mtDNA patterns in the upper panel were produced by cleaving the DNA with the restriction enzyme, Eco RI, and the lower with Hinc II. Lanes 1-3 are three different rough-toothed dolphins, 4-5 bottlenose dolphin, 6-8 are common dolphins, 9 is a northern right whale dolphin, 10 is a Pacific white-sided dolphin, and 11-12 are offshore spinner dolphins. Although some of the lanes are faint and did not reproduce well in the figure all species do indeed show distinct restriction patterns.



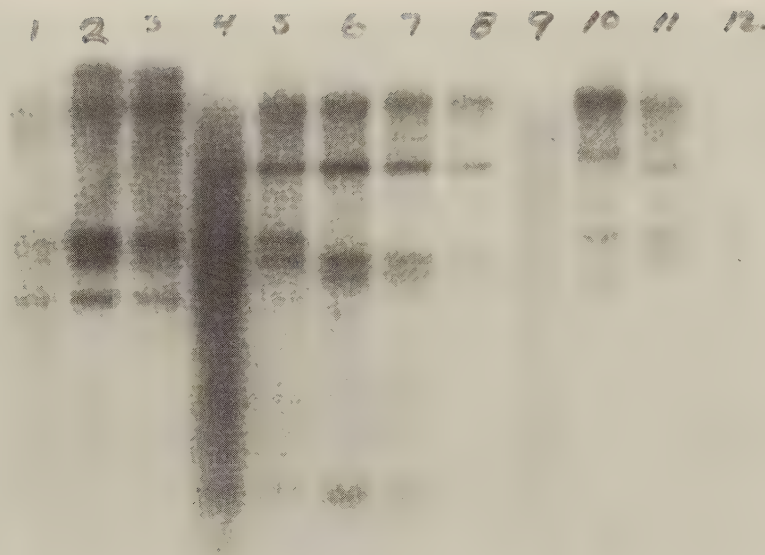


Figure 1. The mtDNA patterns in the upper panel were produced by cleaving the DNA with the restriction enzyme, Eco RI, and the lower with Hinc II. Lanes 1-3 are three different rough-toothed dolphins, 4-5 are bottlenose dolphin, 6-8 are common dolphins, 9 is a northern right whale dolphin, 10 is a Pacific white-sided dolphin, and 11-12 are offshore spinner dolphins.

Status of Atlantic Tuna Fishery Sampling Program

Foreign-caught Atlantic tunas transshipped to Puerto Rico are sampled routinely for biological information by biological technician Eugene Holzapfel. Data on fork length, weight, and species composition of catches are collected. Results of Holzapfel's sampling during the period January 1, 1983 to September 30, 1983 are as follows:

Species and gear	# of samples	# of fish sampled	Tonnage sampled (MT)
Yellowfin			
Purse seine	13	823	447.8
Baitboat	18	1295	268.3
Longline	1	71	1.1
Unknown	9	642	141.9
Skipjack			
Purse seine	7	355	2032.2
Baitboat	5	250	552.2
Unknown	2	101	117.0
Bigeye			
Purse seine	9	336	253.7
Baitboat	1	39	15.6
Unknown	5	125	33.8
Albacore			
Longline	2	100	1262.6
Blackfin			
Baitboat	1	50	12.6

MARINE MAMMAL BIOLOGY PROGRAM

Study Completed on Population Biology of the Southern California Coastal Bottlenose Dolphin

A study of the coastal bottlenose dolphin (*Tursiops truncatus*) population along southern California has recently been completed by wildlife biologist Larry Hansen of the Coastal Marine Mammal Project. The size of the population was estimated with a photographic "mark-recapture" technique begun in September 1981. Other aspects of the population, such as seasonal patterns in calving and effects of tide on school size, were evaluated using sighting records collected at the SWFC beginning in November 1970.

Photographs of naturally marked dolphins (Figure 2) were taken during 20 surveys conducted during September 1981-January 1983. From these photographs, 123 dolphins were individually recognizable, 71 were sighted during 2 or more surveys and 21 were sighted 5 or more times. Three individuals were seen 9

times. Four mark-recapture estimators were used, giving population estimates of 173-240. The estimate of 240 (confidence interval 120-477) was considered the best.

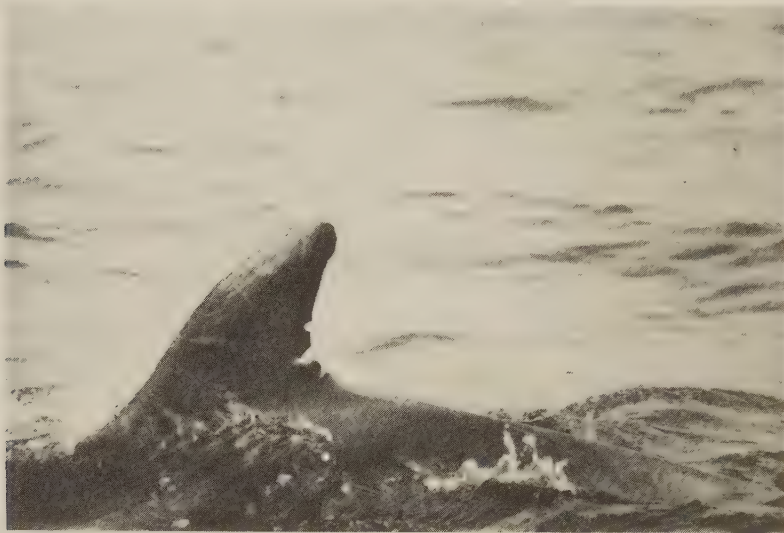


Figure 2. Photograph of naturally marked dorsal fin of a southern California coastal bottlenose dolphin.

The sighting records (n=525) of coastal bottlenose dolphins observed by biologists from the SWFC laboratory were reviewed and provided information on several features of the population. The school size ranged from 1-139, with 19.5 being the mean school size. Approximately 60% of the schools consisted of 1-20 animals. Analysis of the records showed that there were no statistically significant patterns in school size by month or time of day, in total numbers of dolphins sighted by month, and in total number of sightings by month or time of day. Calves were present all year with a slight peak in numbers in October (Figure 3). Records of the Marine Mammal Salvage Program at the SWFC show that nearly all stranded bottlenose dolphin calves have been recovered during October. This indicates that breeding and calving occurs year-round with a peak in the fall.

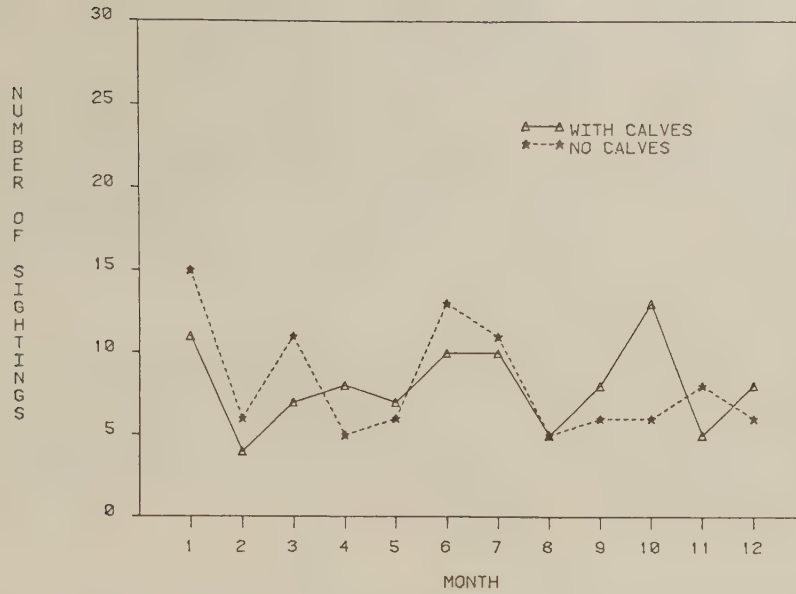


Figure 3. Number of sightings of schools with and without calves by months.

Information on the tidal state (height, rising or falling) during daylight hours was added to 443 of the sightings that occurred during January 1975-February 1983. The variation in the mean school size by tide height (Figure 4) was significant at $p < 0.05$ as was the difference in the number of

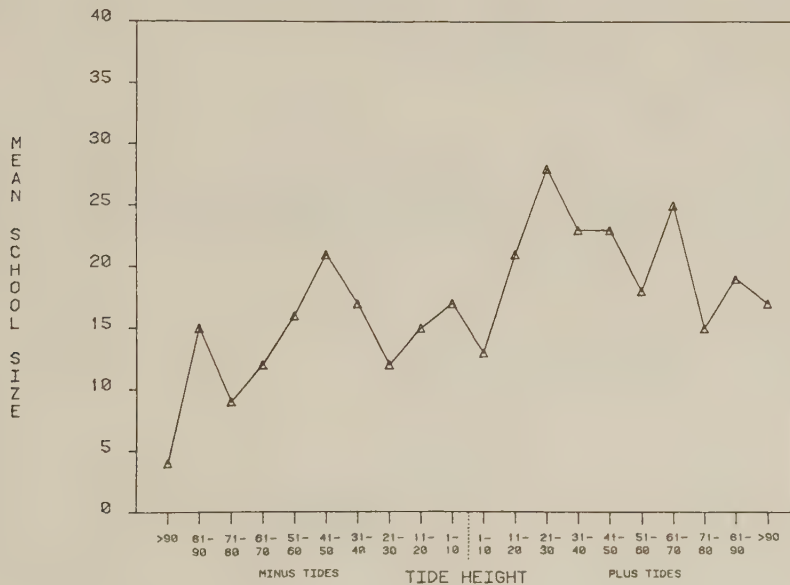


Figure 4. Mean school size by tide height.

sightings at ebb tides (247 or 57%) versus the number of sightings at flood tides (189 or 43%) compared to the normal distribution of ebb tides (46%) and flood tides (54%) during daylight hours. Other workers have found that mean school size of bottlenose dolphins generally increases as water depth increases. Figure 3 shows a general increase; however, the mean school size drops off at higher tide levels. The difference in the number of sightings at ebb tides versus flood tides may be related to physiographic features near the SWFC building. There is a rocky reef below the Center, and at ebb tides fish may be forced out to the reef or confined to shallower water, making them easier to catch. Also, two large, deep, offshore canyons are located near the Center, and may have a relationship to the dolphins presence at ebb tides.

Two student interns, Amy Gannon and Lawrence Sherlaw, from Southampton College in Long Island, New York, are currently conducting a research project on this population of dolphins. They are continuing the photographic surveys and collecting information on behavior, hoping to evaluate the stability of school composition, relation of habitat to behavior, and temporal effects on behavior.

Cruise Conducted to Evaluate the Relative Abundance of Pelagic Schooling Fish in Coastal Marine Mammal Feeding Areas

From July 5 through 22, the staff of the Coastal Marine Mammal Project at the Southwest Fisheries Center conducted a series of evening trawls and daytime surveys on the NOAA Ship David Starr Jordan to evaluate the relative abundance of pelagic schooling fish in critical feeding areas of coastal marine mammals. Dr. Doug DeMaster, Wildlife Biologist was the cruise leader. The objectives of the cruise were: to determine relative abundance indices of sea lion prey species such as anchovy, squid, hake, and mackerel; correlate sea lion and sea bird distribution at sea with environmental variables and with information from satellite imagery; monitor primary productivity over the southern California bight; assist California Department of Fish and Game (CF&G) in monitoring incidental take of marine mammals in large mesh gill-nets and study productivity patterns around seamounts.

The cruise was divided into two legs; the first, involved 44 mid-water trawls spaced as shown in Figure 5. In addition, 116, 30 minute transects were completed, where all sea bird and marine mammal sightings within 300 m of the trackline were recorded. Twice daily, hydrocasts were made to monitor productivity. XBT's were also launched at all trawling and hydrocast stations.



Figure 5. Track lines and station numbers of cruise DS-83-03(163).

Intensive sampling of the water column to determine patterns in productivity associated with various seamounts was conducted on the second leg. In addition, SWFC scientists cooperated with CF&G biologists to observe the incidental take of marine mammals in large mesh gill nets (Figure 6).

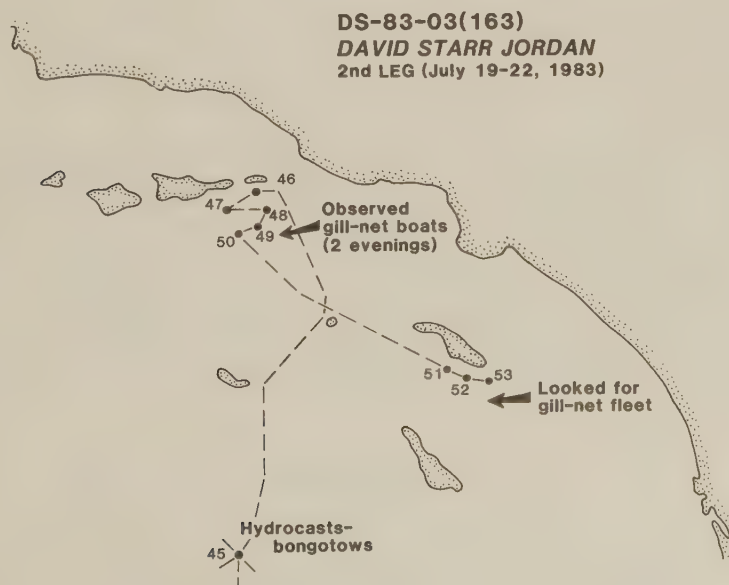


Figure 6. Track lines and station numbers of cruise DS-83-03 (163).

In the mid-water trawls, 34 fish species were present. The dominant species by weight were anchovy and juvenile hake. The average weight of the catch in each trawl was 15.4 kg and ranged from 0 to 138 kg. The pelagic crab, Pleuroncodes planipes, was present 42 of the 44 trawls. Coverage of the intended track lines was good except in the vicinity of San Miguel Island, where inclement weather precluded trawling. The target depth and time of most of the trawls was between 50 and 150 m for 20-25 minutes. Present on the trawl leg of the cruise were Robert Cowan, task Leader, Scripps Institution of Oceanography, (SIO), Sandy Hawes and Mark Lowry of the Southwest Fisheries Center and Waldo Wakefield, Jeff Napp, and Amatizia Genin, all from Scripps.

The transect surveys were conducted by Phil Henderson, task leader, and Janie Hesterly of Point Reyes Bird Observatory, Fred Sorenson and Rose Mary Avery, Moss Landing Marine Lab. Sightings were made to 300 m with binoculars (7 x 35 to 9 x 35) from the flying bridge of the Jordan. Usually two observers and one recorder were on duty. Transects usually began at 0600 and ended at dusk when the evening trawling started.

For the 199 transects that were completed, 23 species of birds and 7 species of marine mammals were seen. The most common sea birds noted were pink-footed shearwater and sooty shearwater. The most common marine mammal was the California sea lion. Approximately 93 hours of surveys were completed.

In addition to the trawling and survey work, hydrocasts were made twice daily (0900 and 1500) during LEG I. Samples were collected with Niskin bottles to determine primary productivity and salinity levels. Samples of phytoplankton were also collected and preserved. Temperatures at depths from the surface to the 1% light levels were recorded as well as Secchi depths at all hydrocast stations.

During LEG II, an attempt was made by Amatizia Genin of SIO to determine the patterns of primary production around Garrett Ridge. He found that surface levels of chlorophyll at this time were unexpectedly low.

The analysis of data collected on this cruise (which will be published as a SWFC Administrative Report) will be directed at identifying areas where bird and mammal densities were highest. These data will be correlated with catch rates and species composition of the trawls. In addition, length-frequency distributions of pelagic schooling fish caught in the midwater trawls will be compared to length-frequency data from food habit studies of sea lions in order to test hypotheses about the feeding strategies of sea lions.

TIBURON LABORATORY

UNDERUTILIZED FISHERIES RESOURCES

Booklet Published on Underutilized California Fishes

Members of the Underutilized Fisheries Resources Task at the Tiburon Laboratory under the leadership of fishery biologist Sus Kato have compiled a Guide to Underutilized Species of California. In addition to brief descriptions of fishing gear and methods, the Guide contains discussions of fifteen species (or, in some cases, groups of fish) which are presently not fully or efficiently utilized. This information is presented in a loose-leaf binder format so that additions can be made easily as other underutilized resources are identified. According to Mr. Kato, the Guide is intended as an aid to both buyers and suppliers interested in expanding into alternative fisheries or fish products, although it is aimed primarily at the Japanese market. Distribution of the Guide will be to industry members and their advisors and consultants.

FISH COMMUNITIES

Predator-Prey Cruise Finds El Niño Conditions

Fishery biologists Peter Adams, Tony Chess, and Susan Smith of the Predator-Prey Task found September 1983 conditions in Central California very different from other years. The effects of El Niño could be observed in both surface water temperatures of 16° to 17°C (versus historical temperatures of 14 to 15°C at this time of year) and in midwater trawl catches. California barracuda (Sphyraena argentea) were found in several trawls and eleven barracuda were taken in a single 15-minute trawl. Bonito (Sarda chiliensis) and jack mackerel (Trachurus symmetricus) were taken in almost every trawl. Ocean sunfish (Mola mola) was also found occasionally. Stomach contents were sampled to determine feeding under these unusual conditions. Many normal components of midwater trawl catches from this area were completely absent--gelatinous invertebrates, Pacific herring and, particularly, Pacific hake. Research cruises made by scientists from the Northwest and Alaska Fisheries Center which are for the purpose of estimating hake abundance, found no such fish in southern areas, and aggregations in northern areas were not large enough to suggest that fish from southern areas have migrated north.

Record Year for Leopard Shark Tag Returns

Fishery biologist Sue Smith received six leopard shark returns in September from Bay Area anglers--four from San Francisco Bay and two from along San Francisco ocean beaches. The return rate now amounts to 8% of the 948 leopard sharks originally tagged in 1979. Unexpectedly, 10% more returns have been received thus far this year (23 recaptures) than in any previous

year, possibly due to increased fishing pressures for sharks in the Bay, or an increase in their availability. Three of the recent returns came from the San Francisco Bay Shark Derby held on September 10th, in which 1,700 anglers participated. Elasmobranch researchers from Moss Landing Laboratories, who sampled Derby catches, helped the project by monitoring for tags and distributing tagging posters.

Also this month, Smith examined recapture rates in relation to condition of fish at tagging to determine possible effects of tagging mortality. During tagging operations in 1979 a record was kept of sharks that were foul-hooked and bleeding on release (82 individuals). The remainder (866 individuals) were classified as "healthy". To date, 10% of "injured" fish and 8% of "healthy" fish have been recovered, reflecting the hardiness of the species and indicating that tagging mortality, at least from these types of injuries, probably has had little if any effect on the return rate.

Data Entry-Editing System Tested

Dr. William Lenarz, Leader of the Groundfish Analysis Task, reports that his staff has tested a data entry-editing system for biological composition data collected from California rockfish landings under a NMFS, California Fish and Game cooperative program. The system, written in FORTRAN-80 for the La Jolla Standard Microcomputer, was tested by several employees possessing a wide range of computer skills. The data collected during the first half of 1983 was entered and edited. The tests revealed a few remaining errors in the program that occur under usual combinations of data entries and several areas in which the system can be improved in order to make it more user-friendly. The system has proven useful in that it is possible to process the data in a more timely matter than previously; several time-consuming steps have been eliminated, and feedback which catch samplers receive when entering and editing their own data has caused improvements in the quality of data recording. Work has started on incorporating the conclusions from the tests into the system.

Analysis of Port Sampling and Data Expansion Techniques Continue

Candis Cooperrider, Computer Programmer on the Groundfish Analysis Task, assisted visiting statistician, Dr. A. Sen, in his analysis of the Rockfish Task's port sampling and data expansion techniques. A comparison was made between the presently employed method of sampled landing expansions, which makes use of market sort stratifications, and another method which ignores these strata and expands sampled landings to the total landing of rockfish. This comparison was made by estimating mean occurrences per cluster, total number, variance between and within trips, and coefficient of variation for species number, species weights, and year class numbers by sex. In addition, these results and those from a previously conducted study of port sampling effort and related costs will be used to determine the annual minimum number of samples per port required to produce acceptable variances in estimates of catch by species, sex, and age, as well as the cost of the sampling effort necessary to meet this requirement.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Striped Bass Shows Changes in Lipoprotein Profiles

Electrophoretic separations of lipoproteins in striped bass sera collected from field and laboratory studies showed interesting changes in the lipoprotein profiles that were associated with alterations of other physiological parameters. At the time these separations were conducted, however, the identification of the lipoprotein bands (fractions) and factors affecting them were unknown. This information is, in fact, largely unknown in fishes. Studies on the lipoprotein composition of fish serum and factors affecting qualitative and quantitative changes have been restricted to rainbow trout. It is known from human and other mammalian research that serum lipoprotein composition is influenced by nutritional, genetic, pathological, and environmental factors, and therefore can provide important information on the diagnosis of physiological functioning.

In order to determine the meaning of the previous lipoprotein data and to further the knowledge of lipoproteins in fishes, an investigation of the lipoproteins of striped bass was conducted by oceanographer Dr. Bruce MacFarlane, fishery biologist Michael Bowers and biological technician Brian Jarvis. Adult striped bass were subjected to two feeding regimes to assess nutritional influence on lipoprotein composition. One group was fed measured rations of anchovies on a regular schedule; the other group was not fed for 3 weeks prior to sampling. Blood was collected by cardiac puncture. Aliquots of whole blood were analyzed for routine hematological parameters (differential cell distribution, hematocrit, hemoglobin, etc.) prior to allowing clot formation and serum collection. Serum was analyzed for total protein and electrophoresed on cellulose acetate and on both sodium dodecyl-sulfate (SDS) and native polyacrylamide gels to characterize protein components by molecular weight and electrical charge, respectively. Lipoproteins were fractionated and isolated using standard ultracentrifugal flotation procedures developed for human research. Chylomicrons, very low density lipoproteins (VLDL), low density lipoproteins (LDL), high density lipoproteins (HDL), and very high density lipoproteins (VHDL) fractions were recovered. Each fraction was subjected to both types of polyacrylamide gel electrophoresis and cellulose acetate electrophoresis to identify those protein and lipid components in whole serum electropherograms and to determine nutritional effects and individual variability. The remaining portion of the lipoprotein fractions were solvent-extracted for lipid analysis and the precipitated proteins were washed for subsequent apoprotein analysis. Lipid extracts will be analyzed for triglycerides, phospholipids, cholesterol, cholesterol esters and free fatty acids by Dr. John Patton of the Department of Microbiology at the University of Georgia. Apoprotein analysis will be performed by Dr. John Kane of the Department of Medicine and Anatomy, University of California, San Francisco.

FISHERIES INFORMATION AND AUTOMATIC DATA PROCESSING

CalCOFI/INP Data Management Systems Subcommittee Meets in Mexico

On September 6 in Ensenada, Mexico, the CalCOFI/INP Data Management Subcommittee consisting of Dick Heimann of the California Department of Fish and Game, Fred Kellenberger of the Southwest Fisheries Center, George Anderson of the Scripps Institution of Oceanography and Waiaterio Garcia Franco, Javier Magallon and Carlos Castro of the Instituto Nacional de Pesca met to discuss their respective data management systems.

As a result of their meeting the subcommittee decided to take the following action:

- a. Data collections forms are to be sent by each representative to Mr. Kellenberger by October 17, 1983. The data collection forms will then be consolidated into a document and distributed to the subcommittee members and other interested persons;
- b. Each committee member is to submit a technical description of computers and input devices available to each agency to Mr. Kellenberger by October 17. The list will be consolidated and distributed to committee members;
- c. Each committee member is to describe their agency files and submit the description to Mr. Kellenberger by November 1, 1983.

The next meeting of the CalCOFI/INP Data Management Subcommittee will be in March or April, 1984 in Ensenada, Mexico.

CALFIN Update

Three New Data Files Established for PACES

John Davies Computer Systems Analyst, has established three new data files for the Pacific Area Cooperative Enforcement System (PACES). PACES is a cooperative information system among the Southwest Region (SWR), the Southwest Fisheries Center (SWFC), and the California Department of Fish and Game. The three files are as follows:

- a. Investigations - Keeps track of current investigations which includes the warden's name, subject's name and vessel name.

- b. Patrol - Information on patrol costs, number of violations per patrol and number of people involved.
- c. Permits - Listing of experimental gear permits and to whom they belong.

Mr. Davies has expanded the capabilities of the tuna cannery receipt spread sheet so that it will cover Puerto Rico and American Samoa as well as the Continental U.S. data. The program is also more versatile in that the user can specify the year, where the tuna came from, and where they are processed. The program then produces monthly poundage and value figure by species. The value figures take into account price changes on a monthly basis.

Salmon Questionnaire Developed for PACFIN

Fred Kellenberger, SWFC, David Mackett, SWFC and Svein Fougner, SWR, are developing a salmon questionnaire for the Pacific Fishery Information Network (PACFIN). The goals of the Salmon Specification Questionnaire are to solicit the opinion of a broad group of fishery administrators, economists, managers, policy makers, researchers, enforcement officers, and fishing industry personnel on the use of and need for salmon catch and effort data, during and between seasons, and increase awareness by the research group of the data collection and dissemination activities of the PACFIN project.

Through dissemination of the questionnaire, the Southwest Region and Center hope to contact approximately 70 decision makers in fishery management, research, and development, and to solicit their opinions on salmon data needs, uses, and timeliness. The framers are anticipating a response rate of about 50% of those queried and hope to complete the questionnaire process in about 3 months. Messrs. Kellenberger, Mackett and Fougner intend to distribute a summary report on questionnaire findings to the PACFIN Data Committee and officials and all questionnaire respondents.

Susan Iacometti, Computer Systems Programmer, is processing the 1981 (PACFIN) catch data for Washington, Oregon, and California, for input to the PACFIN Fishery Research Information System (FRIS). The file is so large in volume that sorting the file cannot be done on the existing disk space allowance on the VAX. Iacometti plans to divide the file into monthly files by states (a total of 36 files) before sorting.

Meeting Held to Discuss CalCOFI System Update and Expansion

A meeting to discuss the concept of the CalCOFI System update and expansion was held at the SWFC on September 8 with Director Barrett, Deputy Director John Carr, David Mackett, Reuben Lasker, Fred Kellenberger, Rich Charter and Dorothy Roll attending. Mr. Charter and Mrs. Roll discussed the concept of the CalCOFI System update and expansion, presented the methodology and a schedule for implementing the work. For effective work coordination,

Mr. Charter will transfer to ADP Operations for a 6-month period, beginning October 1. In connection with this project, Mrs. Roll has drafted job descriptions for two computer clerks whose primary duties will be data editing and entering of information on other fish larvae and eggs into the CalCOFI data system.

Software Development Continues for SWFC's Financial Reporting System

Bob Nydam, Computer Analyst and Rob Bistodeau, Computer Assistant employed at the SWFC under a student appointment, continue to develop software for the Financial Reporting System which will be implemented on the Super-Microcomputer system. In addition, Mr. Bistodeau has developed and implemented a data entry procedure on the La Jolla Standard microcomputer for the milestone dates for all projects. He has generated reports of the target dates for these projects in a specified sorting order.

ADP Unit Assists in Developing Computer Network for Southwest Region

Mr. Kellenberger and his staff in Data Management/ADP operations are assisting the Southwest Region in developing communication capabilities between their NBI word-processing unit in the Terminal Island office, the La Jolla Standard Microcomputer in the San Diego office and the microcomputer system in the Honolulu office. Mr. Bob Nydam is consulting with NBI specialists on communication interface with non-NBI computer systems.

Status of WPACFIN Reported

David C. Hamm, Computer Systems Analyst, and Todd Kassman, Computer Programmer, were involved in various Western Pacific Fishery Information Network (WPACFIN) developmental and supportive activities. Hamm reports that under a cooperative agreement with the Southwest Fisheries Center, the Hawaii Division of Aquatic Resources (HDAR) completed a draft document on a study of its current data collecting and processing systems. The document lists priority recommendations for reorganization within the HDAR for improved computer capabilities.

Under a contract with the Western Pacific Regional Fishery Management Council and with the cooperation of the Honolulu Laboratory, the Guam Fishermen's Coop modified its data collecting and processing procedures, and all historical Coop landings data from July 1979 to May 1983 have now been processed. Summaries of catch by species have been prepared for all available Coop data and reports have been distributed.

The computer hardware at the Guam Division of Aquatic and Wildlife Resources (GDAWR) was augmented by the addition of a 32-K printer buffer and a processing accelerator card that speeds computer processing by 3.6 times. To improve the design of the GDAWR creel censuses and to develop statistically

valid expansion algorithms, a contractor was hired through WPACFIN funds. Kassman has begun computer programming to handle the creel census data.

The Division of Fish and Wildlife (DFW) of the Commonwealth of the Northern Mariana Islands (CNMI) is actively improving WPACFIN data collecting and processing. Data bases have been established for all the major fisheries in the CNMI. A 32-K printer buffer was recently added to the system to improve reporting capabilities. The DFW is considering a creel census similar to Guam's. To assist in the design and implementation of the creel census and to ensure the statistical validity of the expanded catch estimates, a WPACFIN contract was awarded for a CNMI study similar to that for Guam.

In American Samoa, WPACFIN data collecting and processing continued, and landings data for fiscal year 1982 have been processed.

Although WPACFIN does not include the Republic of Belau, assistance has been provided to its Marine Resources Division in the development and implementation of a data collecting and processing system through 88-309 support.

ADP Procurement Activities in Progress

Mrs. Dorothy Roll, Computer System Analyst, reports that the Severn Companies, Inc., in Annapolis, Maryland, were awarded the contract to furnish the Molecular Supermicro 32X's for the La Jolla, Tiburon, and Honolulu Laboratories. On September 23, Severn representatives met with Jack Brown, Electronics Engineer, Bob Nydam, Computer Program Analyst, and Mrs. Roll to discuss specific requirements for the delivery and installation of the systems. Some of the application processors and the tape unit will be provided by AAA Data Processing Inc., Crofton, Maryland. In order to ensure integration with the systems, the parts will be shipped to Severn before delivery to the laboratories.

General Data Co., Inc., of Pittsburgh, Pennsylvania, will provide the Molecular Supermicro 15-8 for the NOAA Ship David Starr Jordan. The system will be tested by Jack Brown before shipboard installation; delivery of the system is expected in La Jolla in early October.

SWFC Requests Procurement of Printers to Support Word-Processing System

In response to the Southwest Fisheries Center's request to procure the three-letter single-track printers and two letter-quality dual-track printers to support the La Jolla Laboratory's word-processing system to be implemented on the La Jolla Standard Microcomputers and the Supermicro 32X, 13 vendors submitted bids. Only one vendor could meet specifications for the dual track printer and then with a delivery date of 6 months. With the advice of Messrs. Brown and Nydam, the Word Processing Committee at La Jolla Laboratory (Lorraine Prescott, Frances Begley, Julie Shoemaker, Jack Brown and Dorothy Roll) selected the NEC 7710 for the single-track letter quality printers and cancelled the request for the dual track printer.

* * * * *

In other news of ADP activities, Dorothy Roll completed the update on the Southwest Fisheries Center's Data File Dictionary. The file, which is on a word-processing system for each update has been distributed to the data managers in each of the Center's Laboratories and Divisions for their review.

* * * * *

A training seminar for La Jolla Laboratory was held on September 29 entitled, "Taking the Stress out of Using the VAX" and was conducted by Susan Iacometti especially for non-computer type users.

MISCELLANEOUS

HONORS AND AWARDS

Honolulu Laboratory

Honolulu Laboratory Director Richard S. Shomura presented performance awards to the following Laboratory personnel at a general staff meeting on September 14.

Outstanding

James C. Cooper
Alan R. Everson
Mary Lynn Godfrey
Victor A. Honda
Robert L. Humphreys, Jr.
Brent M. Miyamoto
Dorothy D. Powell
Michael P. Seki
Darryl T. Tagami
Marian F.Y. Yong
Elizabeth D.Y. Young

Sustained Superior Performance

Melvin J. Dutro
Virginia L. Ishida
Tamotsu Nakamura
Nathaniel T. Shippen
Irene H. Toyomura
Carole A. Yukihiro

Special Act

Alice-May Drury
Reginald M. Gooding
Tamotsu Nakata
Jeffrey J. Polovina

La Jolla Laboratory

At an assembly in the auditorium of La Jolla Laboratory staff on September 26, Dr. Izadore Barrett, Center Director, presented the following awards:

Outstanding

Roy M. Allen, Director's Office
David Au, Oceanic Division
Jay Barlow, Oceanic Division
Tod Foster, Oceanic Division
Sam Herrick, Oceanic Division
Aleta Hohn, Oceanic Division
Nancy LaRoche, Director's Office
Susan Picquelle, Coastal Division
Ken Raymond, Director's Office
Steve Reilly, Oceanic Division
Lillian Vlymen, Director's Office

Sustained Superior Performance

Virginia Cass, Oceanic Division
Mark Lowry, Oceanic Division
Albert Myrick, Oceanic Division
Charles Oliver, Oceanic Division
Frank Ralston, Oceanic Division
Priscilla Sloan, Oceanic Division
James Squire, Oceanic Division
Cynthia Thomson, Coastal Division
Ken Wallace, Oceanic Division
Charles Wright, Administrative Services

Special Act or Service

Lisa Ankenbrandt, Oceanic Division
Veronica Breda, Administrative Services
Victorio Gorospe, Coastal Division
David Holt, Oceanic Division
Virginia Hostler, Director's Office
Ruth Miller, Oceanic Division

Tiburon Laboratory

Receiving awards at the Tiburon Laboratory this month were:

Outstanding

Walburga Giguere, Administrative Officer

Sustained Superior Performance

Candis L. Cooperrider, Fishery Biologist
Catherine J.C. Hurst, Administrative Clerk

PUBLIC AFFAIRS

La Jolla Laboratory

- September 9 - Fishery biologist James Squire spoke to 50 members of the Vagabundos del Mar, Trailer Boat and Travel Club in Rancho Bernardo on "Tagging and El Niño and current billfish fishing results relative to sea surface temperatures."
- 17 - Dr. Albert Myrick, Wildlife Biologist, presented a lecture to the members of the American Cetacean Society of San Diego meeting at the San Diego Museum of Natural History on the subject, "Everything you wanted to know about whales." In particular, Dr. Myrick discussed evolution and morphology research.

PRESS RELEASE

Honolulu Laboratory

- September 27 - "Fishery Vessel Completes Squid Survey."

SEMINARS

Honolulu Laboratory

- September 22 - Raymond Buckley of the Department of Fisheries, State of Washington, Seattle, Washington, spoke on "Survey of marine fauna around fiberglass reinforced plastic reefs in Florida."

La Jolla Laboratory

- September 20 - Mr. Ashley Mullen, Inter-American Tropical Tuna Commission presented a lecture on the subject, "A model for tuna and dolphin: A discussion of the underlying hypotheses and their implications."

VISITORS

Honolulu Laboratory

- September 2 - Craig Harrison, formerly with the U.S. Fish and Wildlife Service (presently a student at the UH Law School), met with Richard S. Shomura and Michael P. Seki, to discuss the preparation of a chapter on bird-fish interactions for a book.
- Dr. Dean Parsons, NMFS, Washington, DC, visited Richard Shomura. Dr. Parsons participated in the first leg of Townsend Cromwell cruise 83-03.
- 6 - Dr. Edward P. Myers, Office of Ocean and Coastal Resource Management, Ocean Minerals and Energy Division, NOAA, and Dr. Donald Hoss and Dr. David Peters, Beaufort Laboratory, Southeast Fisheries Center, NOAA, visited Richard Shomura. Richard Uchida, Michael Seki, and the visitors participated in a week-long series of OTEC meetings with State, UH, and industry representatives to discuss the possible impact of OTEC operations on fisheries.
- Dr. John Craven, Director/Chairman, Law of the Sea/ Marine Council, UH, and Dr. Gary M. McMurtry, Assistant Geophysicist, Hawaii Institute of Geophysics, UH, discussed future research plans for the Makalii with Richard Shomura.
- 8 - Dr. Murray D. Dailey, Director, Research and Development, Hawaiian Fishing Research Company, Grosvenor Center, Honolulu, visited Richard Shomura to discuss lobster and shrimp research.
- 12 - Padma Lal, a UH faculty member's wife, visited Richard Shomura. She was formerly with the Fisheries Agency, Government of Fiji.
- 14 - Dr. Lamarr Trott visited Richard Shomura. Dr. Trott completed an IPA assignment at UH and is returning to NMFS, Washington, DC.
- 15 - Burne Hill, University of Washington graduate student, visited Richard Shomura.
- 21 - Richard Shomura and Samuel G. Pooley met with Dr. Paul Callaghan, Government of Guam, and Paul Bartram, Council, to review two bottom fish proposals submitted to the Council.

- 22 - Lloyd Richards of the NMFS Southwest Region met with R. Shomura to discuss the foreign fishing observer program.

La Jolla Laboratory

- September 1 - RADM Charles Townsend, Director, Pacific Marine Center, Seattle, Washington visited the Center.
- 9 - Dr. Robert A. Skillman, Hononolulu Laboratory, visited the Center.
- 13 - Susan Townsend, Motivators, Inc., met with John Carr.
- 15 - Mr. David A. Berube, NOAA, Rockville, Maryland visited the Center.
- 28-29 - The Pacific Fishery Management Council met in San Diego to consider comments and statements from the public, National Marine Fisheries Service, and other interested parties on Draft Anchovy Fishery Management Plan Amendment #5. In connection with this meeting, a number of Council members including the Chairman John R. Donaldson and the Executive Director of the Council, Joe Greenley, Don Carper, newly-selected head of the California Department of Fish and Game and his Deputy, Bob Fletcher, visited the Center for briefing on research conducted here by Drs. Dan Huppert, John Hunter and Gary Sakagawa. Deputy Director John Carr coordinated the details of the visit and was host to the Council members.

Tiburon Laboratory

- September 1 - Bill Phoel, NEFC, Sandy Hook Laboratory, Highlands, New Jersey.
- 21 - Tony Ichinose, A.B.S. Fishing Co., San Francisco.
- 27 - Frederic Thurberg, NEFC, Milford Laboratory, Milford, Connecticut.

MEETINGS AND TRAVEL

Honolulu Laboratory

- September 7 - Dr. Jerry A. Wetherall and Dr. Jeffrey J. Polovina attended a briefing on the results of the charter of the purse seiner, Jo An, in waters around the NWHI. The vessel was chartered by the Pacific Fisheries Development Foundation (PFDF) (formerly Pacific Tuna Development Foundation).
- Mary Lynne Godfrey attended the Aloha United Way kickoff luncheon.
- 19-20 - Richard Shomura attended the PFDF Board of Directors meeting at the Hawaiian Regent Hotel.
- 23 - Richard Shomura had a meeting with Dr. Jack Davidson, UH Sea Program, Dr. Philip Helfrich, HIMB, UH, Dr. Gary McMurtry, Hawaii Institute of Geophysics, UH and Dr. James Maragos, U.S. Army Corps of Engineers, to discuss Johnston Atoll research.
- 26-30 - Richard Shomura attended the Council meetings in Guam and Rota Island, CNMI.
- 29 - Acting Laboratory Director, Richard Uchida presided at the Townsend Cromwell post-cruise meeting (TC-83-03). Walter M. Matsumoto, Chief Scientist on the cruise, reported on the results of the cruise.

La Jolla Laboratory

- September 6 - Fred Kellenberger and Rich Charter traveled to Ensenada to attend a CalCOFI/INP meeting.
- 9-19 - Charles Oliver was at San Clemente Island to tag sea lion pups.
- 11-13 - Dr. David Au was in Miami, Florida, to attend a Bluefin Workshop.
- 12-16 - Virginia Hostler was in Seattle, Washington, to meet with Western Administrative Support Center staff for discussions on administrative matters.
- 14-15 - Richard Methot traveled to Bodega Bay, California, to consult with Dr. Louis Botsford and David Johnson on Dungeness crab recruitment research.

- 14-19 - Lisa Fern was in San Clemente Island to tag sea lion pups.
- 15-16 - Izadore Barrett attended a meeting on U.S. Mexican relations on Marine Resources at University of California, San Diego.
- September 17- - Mike Laurs traveled to Shimizu, Japan, to participate
October 1 in the 8th North Pacific Albacore Workshop; meet with Japanese scientists concerning satellite applications to fisheries; and to meet with Japanese scientists on albacore tagging. Norm Bartoo also traveled to Japan to attend and present papers at the Albacore Workshop.
- September 18- - William Perrin in Washington, DC, to attend the
October 5 Interdepartmental Foreign Affairs seminar.
- September 19 - Izadore Barrett and John Carr traveled to Dana Point, California, for a meeting with Acting Regional Director Floyd Anders and senior staff.
- 22 - Izadore Barrett traveled to San Francisco, California, to attend a Pacific Coast NMFS Director's meeting with Floyd Anders, Bill Aron and Bert Larkins representing the directorships.
- 23-29 - Doug DeMaster, Larry Hansen, and Sandy Hawes traveled to San Miguel Island, California, to tag and resight tagged sea lions and collect scats.
- September 25- - Reuben Lasker was in Halifax, Nova Scotia, to attend
October 1 the Intergovernmental Oceanographic Commission (IOC) Workshop on the International Recruitment Project.
- September 27 - Richard Methot was in Los Angeles, California, to attend the public hearing on the anchovy management plan and to provide scientific expertise on questions.
- 27-29 - Izadore Barrett was in Washington, DC, to attend a meeting of the Marine Fisheries Advisory Committee (MAFAC) meeting.

Tiburon Laboratory

- September 2 - Mickey Eldridge visited the Humboldt State University Marine Laboratory at Trinidad, to discuss problems associated with marine seawater systems with staff.

- 9 - Sus Kato traveled to Moss Landing Fisheries to discuss progress of a joint project on minced fish products with their staff.
- 13 - A meeting at Tiburon Laboratory on the problems associated with the widow rockfish quota was attended by Tom Jow, Dave Thomas, Frank Henry, Steve Schultz, and Mel Odemar, of CDF&G and Bill Lenarz, Ed Ueber, and Norm Abramson of Tiburon Laboratory.
- 20 - Several Tiburon scientists visited the University of California's Marine Laboratory to discuss topics of mutual scientific interest and to be briefed on improvements in the Bodega facility and program.
 - Ed Ueber and Sus Kato participated in a meeting of the Bay Area Advisory Panel for Sea Grant, held in San Francisco, California.
- 29 - Scientists representing all three investigations at the Tiburon Laboratory toured the University of California Marine Laboratory at Santa Cruz and the Monterey Sea Aquarium, which is under construction.

PERSONNEL ACTIONS

Honolulu Laboratory

- September 2 - George W. Boehlert, Supervisory Fishery Biologist (Research) - Full-Time Permanent Appointment.
- 4 - Rodney T. Watson, Biological Aid (Fisheries) - Conversion to Temporary, Part-Time Appointment.
- 6 - Kathleen M. Lau, Computer Programmer - Resignation.
- 12 - Dung A. Branton, Computer Programmer - Conversion to Temporary Appointment.
- 17 - Rachel Louie, Computer Programmer - Resignation.
- 20 - Graydon A. Keala, Biological Aid (Fisheries) - Resignation.
- 21 - Linda A. Barraclough, Biological Aid (Fisheries) - Conversion to Temporary Appointment.
- 30 - Daniel A. Mahar, Biological Aid (Fisheries) - Termination.

La Jolla Laboratory

- September 4 - Robert Bistodeau, Computer Clerk - Pay Adjustment,
Part-Time.
- 12 - Amy Kimball, Biological Aid - LWOP.
- 18 - William Flerx, Fishery Biologist - Promotion.
- 20 - Catherine Dargan, Biological Technician (Microbiology)
Part-Time, Temporary Appointment.
- 23 - Lisa Lau, Biological Science Student - LWOP.
- 26 - John Michno, Biological Science Student - LWOP.

Tiburon Laboratory

- September 30 - Mark A. Allen, Fishery Biologist - Termination,
(Temporary Appointment).
- Steven J. Pace, Biological Aid - Termination,
(Temporary Appointment).

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